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Procedia Economics and Finance 27 (2015) 240 – 247

Procedia Economics and Finance

www.elsevier.com/locate/procedia

22nd International Economic Conference – IECS 2015 "Economic Prospects in the Context of Growing Global and Regional Interdependencies", IECS 2015

The Assessment of the Intellectual Capital as a Factor of Investment Attractiveness of the Region

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Abstract

In the conditions of transition to the era of post-industrial society intellectual capital of the region is a key factor of the investment attractiveness of the region. In the article the method of calculating the values of the integrated indicator of the intellectual capital of the Volga Federal District on the basis of an ideal point. In the research are proposed ranking of the regions according to the degree of the development of intellectual capital is conducted and the directions of development of the intellectual capital of the region are offered.

Peer-review under responsibility of Faculty of Economic Sciences, "Lucian Blaga" University of Sibiu"

Keywords: Intellectual capital, Investment attractiveness, Regional development, Integral indicator;

1. Introduction

The structural changes in the principles of business are caused by informatization, globalization and a humanization of administrative processes, which define the leading role of the intellectual capital (IC) in the conditions of the modern economy. Ideas generate ideas. Modern information and communication technologies catalyze this process, expand the geographical boundaries, blurry boundaries in chains of creation of value, create conditions for a permanent reproduction of intellectual capital.

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Peer-review under responsibility of Faculty of Economic Sciences, "Lucian Blaga" University of Sibiu"
doi:10.1016/S2212-5671(15)00997-1

The intangible component plays important role for investment and competitiveness of the region at a modern stage of development of society that is substantially caused by the increasing role of the intellectual capital.

Thus, the assessment of the intellectual capital of the region is necessary for the analysis of the investment attractiveness of the region. Some questions are need to be solved, these questions are considered in the article. Firstly, it is necessary to define structure and concept of the intellectual capital of the region. Secondly, it is necessary to choose what criteria of the intellectual capital are important for the assessment of the integrated indicator.

2. Definition of concept of the intellectual capital of the region

There is a wide choice of factors now, which influence the investment attractiveness (Sharaev Y., 2006). The studyof social and economic development led to emergence of the concept of the intellectual capital at the regional level which earlier arose and applied at the micro level.

There is no uniform approach to the definition and the structure of the intellectual capital. Different authors define different components of intellectual capital, which range from two to five and Matt vary from each other.

Let's consider the most well-known definition and classification of intellectual capital by authors such as E. Brooking, T. Stewart and L. Edvinson.

In the work "Intellectual Capital: Core Assets for the Third Millennium Enterprise", published in 1996, Annie Brooking defines the intellectual capital as "the term of designation of the intangible assets, which the company cannot exist without". According to E. Brooking, the intellectual capital should be considered as a combination of four elements: (Brooking A., 1996)

- marketable assets are the potential that is provided by intangible assets, which are associated with market transactions (customer loyalty, order backlog, distribution channels, etc..);
- human assets are the set of collective knowledge of the staff of enterprise: their creative abilities, abilities to solve problems, leadership skills, enterprise and administrative skills;
- intellectual property is the tool for protection of various corporate assets (a trademark, author's rights, patents, a know-how, etc.);
- infrastructure assets are the technologies, methods and processes which make work of the enterprise possible (corporate culture, risk assessment methods, methods of management of the personnel, etc.).

T.A. Stewart in his monograph defines the intellectual capital as the sum of all knowledge of employees of the company which provides it competitiveness. "The intellectual capital is the intellectual material including knowledge, experience, information and intellectual property and participating in creation of values". It is collective intellectual energy (Stewart T., 2001).

At the same time Bagov V.P. and Seleznyov E.N. considered the intellectual capital as property of an economic entity, the organization and offered the following definition: "The intellectual capitalis the intellectual richness of the organization that determine its creative opportunities for creation and realization of intellectual and innovative production.In this case, the intellectual capital consists of two main components: human capital and intellectual property." (Bagov V.P., 2006).

In the common, the intellectual capital is understood as set of knowledge in the form of the theory, creative results, abilities, skills and competences of staff of the company.

If we talk about the forms of embodiment of the above components, the intellectual capital in this definition is shown in the following forms:

- The intellectual capital as it self - this knowledge has potential value, the ideas. In this case, intellectual capital has no real value, while it is still not protected and not used.
- Intellectual Property - a knowledge that someone else's property, it protected by patent. According to the definitions intellectual property has the potential quantitative value, which depends on its potential use. The objects of intellectual property rights include inventions, utility models, industrial designs, trademarks, service marks, trade, commercial names and designations.

- Intellectual assets - knowledge, has a certain value and definitions used in a focused way. That is patents licensed for a particular purpose, that are converted into intelligent intellectual property assets available for certain of its owner, expressed in money value. For example, patents, trademarks, copyrights, trade secrets, "know-how".

As the review of references and Internet resources, the problem of estimation of the intellectual capital and its efficiency, in common, considered as the level of the separate enterprises. Thus large companies act as objects of research, such definitions "market value" and "market capitalization" can be applied to the object. We tried to consider process of usage of the intellectual resources at the level of the regional economy. A research objective is an attempt to classify regions by intensity and structure of components of the intellectual capital.

The study of the intellectual capital of the region began in the second half of the 2000s., Where the object of study can be both countries and regions of the same country.

The intellectual capital of the region includes knowledge, skills and abilities of all structural components of the region, their social relationships and communication, as well as the supply of other goods, intangible, contributing to their effective usage, which is in need of investment flow, that allows the region to get a competitive advantage in relation to the other regions of the state and other states, to increase their investment appeal.

3. Definition of concept of the intellectual capital of the region Analysis of the composition and structure of the intellectual capital of the region

Problems of the intellectual capital structurization were investigated in many foreign and domestic scientists' works. However the structure of the intellectual capital remains rather versatile and ambiguous.

Stewart is considered as the author of three-component structure of the intellectual capital which is used in the majority of scientific and practical researches today, and he is also applied at introduction the practician of the intellectual capital management in the company. Stewart assigns the leading role to the human capital which is supported structural and consumer capital.

The human capital is concluded as the staff of the company. It easily dissipates, therefore needs continuous building and concentration.

Stewart carries the structural capital rather diverse for organizations elements. Such knowledge may be technologies, inventions, a know-how, strategy, culture of the company, structure and internal rules of company.

The consumer capital, as well as the human capital, only partly belongs to the company. It owns on an equal basis with clients and suppliers. The consumer capital is defined by quality of the relations with external partners of the organization: individual approach, cooperation (for example, at joint development of a new product or service), culture of exchange of information, etc.

We would like to pay attention that Stewart allocates a complementarity of three intellectual capital components. The human, structural and consumer capitals of firm interact, they are capable to strengthen and to weaken each other. It is not enough to invest in each of them separately, it is necessary to consider a thin matter of their interference.

However, the specified structure of the intellectual capital is not the only one. Each researcher has own vision of its structure, justification of its elements and relationships between them.

So, detailed structurization of the intellectual capital two-component structure (fig. 1) was presented in L. Edvinsson's publication though it is easy to notice, that it is not essentially strongly differs from the given Stewart's classification.

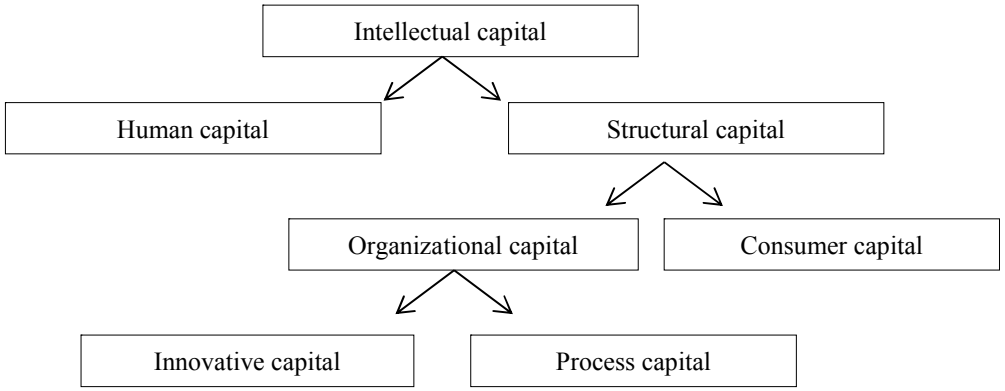

Fig. 1. Model of the intellectual capital according to L. Edvinsson
Source: Edvinsson L., 1997

Edvinsson considers the human capital as real and potential mental abilities, and also the corresponding practical skills of employees of the company. The structural capital includes the client and organizational capital. The client capital represents the value concluded in the relations with clients. The organizational capital shares on the innovative capital (patents, license agreements, trademarks, ideas, etc.) and the process capital represents infrastructure of the company (information technologies, working processes, etc.), i.e. the capital is materialized in effective internal business processes of the company.

L. Edvinson actively popularizes the concept of the intellectual capital, claims that in the conditions of modern economy a key factor of the company's business success will not be the traditional financial capital (which "the corporate width" is connected), but exactly the intellectual capital (which "the corporate longitude" is connected).

However, the lack of Edvisson's approach of the intellectual capital structurization is that the intellectual capital of the enterprise is presented in the arithmetic sum form of its static elements. The connection with complexity of the considered phenomena is also necessary to consider interaction of elements among themselves, their dynamics, and also an unequal role of value creation of the enterprise.

Such attempt was made by the Swedish researcher K. Sveybi. He divides the intellectual capital structure into external and internaland adds internal competence (competence of the personnel). K. Sveybi attributed to competence of the personnel abilities such as ability to work in various situations, education, qualification, skills, abilities, experience, the general level of culture, the relation to work, to partners and clients. In this case, the internal structure is patents, a know-how, author's rights, systems of network interaction, computer and management systems, organizational structure, culture of the organization. The external structure is characterized by brands, trademarks, image of the enterprise, the relation with consumers, clients, competitors, public organizations.

According to V.P.Bagov, E.N.Seleznyov and V.S.Stupakova, intellectual capital represents the intellectual richness of the organization, that determines its creative opportunities for creation and realization of intellectual and innovative production. Thus, it consists of two elements: personnel capital and intellectual property (tab. 1).

Table 1. Model of the intellectual capital (E. N. Seleznyov).

Intellectual capital	
Personnel capital	Intellectual property
• Human assets	• Productive intellectual assets
• Structural assets	• Marketing intellectual assets

Sourse: SeleznyovE.N., 2007

The intellectual property is dual. On the one hand, it is goods in the market of intellectual production, on the other hand it is the tool which is directly participate and substantiate in creation of innovative production. Essentially, general difference between the considered approaches to structure of IC is that the human capital is part of intellectual capital, which forms IC and IC itself is the most great value of the company, includes a stock of knowledge, practical skills, mental abilities of people, their moral values, motivation, which are used by the organization for obtaining the income.

Unfortunately, there is no terminological unity in the name of separate components of the intellectual capitalyet, even if their quantity is the same in the corresponding classification.

The considered approaches of structure of the intellectual capital of the enterprise allow to draw the following conclusions:

- The least divergences meet in designation of the human capital. And most of the authors allocate it as the main component of the intellectual capital.
- Many authors identify the consumer capital as relational, market or external (including in its structure of relationship of the company with suppliers, intermediaries and other partners).
- In all approaches as an obligatory component acts the innovative capital, that represent in the form of intellectual property and organizational capital.

Based on the study of classifications of intellectual capital, the structure of the intellectual capital of the region needs to enable social capital, as it is characterized by the following features. Firstly, social capital cannot be in private ownership, as an element of socially organized social system, and therefore it is a public good. Secondly, social capital has social, not individual nature isconsider the interpretation of the elements of intellectual capital in the regional aspect:

- Human capital. The content of this category does not differ from classical understanding and includes set of knowledge, abilities, education, experience, practical skills andpotential employees of the enterprises, institutions in the region that is advisable to use them and contribute to the investment attractiveness and competitiveness of the region.
- Innovative capital. The ability of the region to the preservation and enhancement of the performance of human capital in the region. This is reflected of the creation and use of the products of scientific and technological progress, the development of information technology, information and communication.
- Structural capital. It is set of market characteristics and infrastructure of the region in which the human capital is realized: culture, norms, efficiency of government institutions, interaction in the region.
- Social capital appears in characteristic of the external relations of the region, its attractiveness and image, the demand for its products, the attractiveness for investments and joint projects.

4. The model of an assessment of the intellectual capital of the region

The researches devoted to an assessment of the regional intellectual capital allows to speak about existence of communication between the economic situation of the country and the development of its intellectual capital. The analysis on the example of subjects of the Russian Federation shows preservation of this communication and upon transition from the international level to the level of regions of one country. Thus, there are bases to speak about the intellectual capital as a factor of investment appeal of the region in the conditions of economy of knowledge.

This research pursues such aims as studying of interrelations between elements of the intellectual capital and its influence on development of the country, definition of indicators by means of which it is possible to estimate the intellectual capital.

The research of structure of the intellectual capital of the region allowed to offer system of indicators for an assessment of the intellectual capital of the Volga Federal District to the Russian Federation on the basis of its components.

Education level of the population on 1000 people (EL), funds coefficient (FC) and a level of unemployment (UL) are parts of the human capital of the region.

The structural capital is presented by an indicator "An assessment by the population of activity of executive authorities (AEA)". Because the government regulates conditions of innovative processes. Effectively working executive authorities create more attractive conditions for investors.

The innovative capital contains two indicators: costs of research and development (CRD) and number of the granted patents for 10000 people of the population (PI).

The social capital includes three elements: investments into fixed capital per capita (IFC), foreign investments per capita (FI) and number of the placed persons in collective means of placement (NPP).. This category reflects the attractiveness of the region as a place of study, rest, work and the general image of the region. However, investment attractiveness will be considered as the attractiveness of the region in this work.

The values that are chosen have larger distinctions in units of measure and in the size of indexes. Therefore, the values were unified for possibility of their comparison. To bring the data to a single system of measurement were used the following formula of the linear transformation:

$$\tilde{x}_{ij} = \frac{x_{ij} - min_j}{max_j - min_j} * 9 + 1 \qquad (1)$$

The following formula was applied to normalization of the data connected by a feed-back with an index:

$$\tilde{x}_{ij} = \frac{max_j - x_{ij}}{max_j - min_j} * 9 + 1 \qquad (2)$$

where – subject of Volga Federal district, - criterion of IC, - maximal values of criterion, - minimum value of criterion.

The received indicators keep within a framework [1; 10], where:

- 1 = the inferior value of an index, in comparison with other regions of Volga federal district, estimated within this work;
- 10 = the best value.

Results of calculations of private indexes for 2013 are given in table 2. The data received as a result of calculations were used for calculation of an integral index of the intellectual capital of each region. As a consequence of being computed regions were ranged relatively each other.

Table 2: Private indexes of IC for regions of Volga federal district.

Federal subjects	EL	FC	UL	AEA	CRD	PI	IFC	FI	NPP
Republic of Bashkortostan	1,38	2,06	2,91	4,33	1,18	4,64	3,16	1,58	6
Mari-El Republic	3,75	9,47	4,55	3,79	1	5,71	3,16	1,06	1,04
Republic of Mordovia	6,13	9,74	6,73	9,1	3,23	2,57	3,2	2,07	1
Republic of Tatarstan	7,5	6,29	7,82	10	3,65	10	10	2,88	10
Udmurt Republic	4,75	5,24	3,18	1,63	5,32	3,69	1,4	1,23	2,2
Chuvash Republic	4,13	10	3,18	5,28	4,26	4,18	1,43	1	1,92
Perm Krai	1	3,91	1	5,95	3,61	5,99	3,76	9,37	4,13
Kirov Oblast	1,13	7,62	3,45	1,95	2,15	2,87	1	1,57	1,92
Nizhny Novgorod Oblast	8	1	7	2,67	10	5,44	4,85	3,58	5,57
Orenburg Oblast	2,25	1	5,36	3,34	1,31	1	4,17	2,34	4,04
Penza Oblast	3,63	7,09	5,64	4,2	1,31	4,11	2,55	1,69	1,41
Samara Oblast	10	7,88	10	2,22	5,51	8,44	4,74	10	5,37
Saratov Oblast	6,75	7,35	4,55	1	1,63	5,22	1,55	1,53	2,4
Ulyanovsk Oblast	3,13	8,94	3,73	2,98	6,04	7,95	2,63	1,67	1,79

At calculation of an integrated indicator of IC is often used various methods of multicriteria decision-making with use of some, an expert way certain, scales of private indicators. Such methods as additive or multiplicative convolution. This way is an essential shortcoming because of subjectivity at a choice of weights.

Therefore, was used a method which is based on an ideal pointwithin this work. According to this method, were decided the subject with the maximum value of separately taken indicator. And the integrated indicator of the intellectual capital of each region calculated on the basis of distance between each alternative and the chosen ideal point.

For determination of the distance we have chosen the Euclidean metrics, and integrated indicators were calculated on a formula:

$$II = 10 - \frac{\sqrt{\sum(\tilde{x}_{ij}-10)^2}}{\sqrt{n}} \qquad (3)$$

where - the Integrated indicator of the intellectual capital, - value of an indicator for region , - number of criteria.

5. Conclusions

The result of calculations for 2013 is presented in table 3.

Table 3: The Integrated indicator and Ranks of Volga Federal Districts subjects.

Federal subjects	II	Rank
Republic of Bashkortostan	2,85	12
Mari El Republic	3,22	9
Republic of Mordovia	4,06	4
Republic of Tatarstan	6,41	1
Udmurt Republic	3,01	11
Chuvash Republic	3,42	7
Perm Krai	3,80	5
Kirov Oblast	2,39	14
Nizhny Novgorod Oblast	4,67	3
Orenburg Oblast	2,61	13
Penza Oblast	3,25	8
Samara Oblast	6,10	2
Saratov Oblast	3,15	10
Ulyanovsk Oblast	3,78	6

On the basis of the received indicators regions of the Volga Federal District were ranged, according to those Republic of Tatarstan got the first place with an integrated indicator 6,41, and the Kirov Oblast got the last place with 2,39.

Advantage of using this model is caused by creation of indexes without usage of expert estimates. That excludes subjective approach and facilitates procedure of calculation of the integrated indicator. Despite that usageof this approach does not give the chance for comparison of the certain subject with global level, the stated approach provides sufficient data of a condition of each of criteria of the intellectual capital and a condition of regions relatively each other.

The results of application of model to the Volga Federal Districts subjects, it is possible to claim that the most investment attractive regions are: Republic of Tatarstan, Samara Oblast and Nizhny Novgorod Oblast. While the Republic of Bashkortostan, the Orenburg Oblast and Kirov Oblast are least attractive to investors. Such alignment of forces is most actual for spheres of action, where usage of the intellectual capital significantly influences on efficiency of their functioning.

Also, the model shows increase in investment appeal of separately taken region it is necessary to pay attention to low private indicators. For example, for the indicator of the Republic of Tatarstan is the volume of foreign investments per capita. This indicator has value below of average and significantly lags behind leaders in this category – the Samara Oblast and Perm Krai.

Within modern post-industrial economy reach intangible assets come to the forefront, and respectively influence on investment appeal increases. Therefore, recently investors pay attention not only to traditional types of assets. The current tendency proves need of using methods of the region's intellectual capital assessment for more detailed analysis of investment appeal. The conducted research revealed need of improvement of region's IC estimating method, the method of the comparative analysis of the intellectual capital's components of various regionswas offered for this reason in work. Further realization of this method will allow to receive the list of territorial subjects of the Russian Federation ranged on degree of IC's using efficiency. It will allow to estimate investment benefit from capital's investment to region and to create a portfolio of securities on the basis of the intellectual capital.

The method of regions ranging, that was offered in the article can reduce risks of informing investment flows by external investors, even though the subject is in need of further development. Also the method can be used by regional governments in introducing information about the position of the region, in paying attention to important criteria.

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